Abstract

An electron source is proposed where a field emitter is formed by a whisker grown epitaxially on a substrate. A ballast resistor and an active area are placed in the body and/or on the surface of the field matter. The ballast resister can be realized as a barrier in the shape of n-n+, p-p+, p-n semiconductor junctions or insulation layer that crosses the charge carrier flow. Components for controlling such electron sources are arranged vertically. This allows to decrease significantly the area taken by the components, and, in such a way, to increase the resolving power of devices and expand fields of their applications. In so doing, owing to whisker-grown field emitters it is possible to control the emission currents by low voltages at strong electric fields.

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